The First Anatomists

ANATOMY has been considered to have had its beginning in the Egyptian practice of embalming the dead, and indeed the practice of preserving dead bodies from corruption could hardly fail to excite some interest in the structure of the human body. But little real anatomy could have been acquired by this means, for the ceremonies of embalming, as told by Herodotus (*c.* 400 B.C.) and Diodorus Siculus (*c.* 80 B.C.), were not such as to allow of a very careful examination of the parts. The incision through which the viscera was to be removed was relatively small, and moreover, was made in rather a hurried manner. "The Cutter," who made the incison in public, used a knife of Ethiopian stone, and he was obliged to get up immediately after committing the deed, and run for his life; for the Egyptians held as odious anyone who did violence to a body of the same nature as their own, and it was customary for the onlookers to maltreat "the Cutter," and to chase him, and pelt him with stones.

The actual embalmers were men of a better standing in Egyptian society, and belonged to a special sect of priests. The abdominal and thoracic viscera were removed by these priests, through the opening made by "the Cutter." This, however, would only allow of the most elementary examination of the anatomy of the different organs, and moreover, the use of such a rude instrument as a knife of Ethiopian stone could not have resulted in anything but the simplest ideas of the subject. The employment of such a primitive knife was probably founded on ancient custom, since it is the very essence of superstition, and the act of embalming was based on superstition, to adhere with the most pertinaceous obstinacy to established practices and customs. Instance after instance might be given in support of this statement. Even as late as the time of Livy it was the custom of the Romans, in ratifying treaties, to slay a victim, usually a hog, by means of a sharp flint, although it is known that brass and iron instruments were in common use at the time. At the general circumcision of the Israelites ordered by Joshua, after their arrival in the promised land, the operation was performed with a stone knife, yet it is well known that the Jews were skilled in all the arts of metallurgy.

The art of embalming, then, as practised by the Egyptians, could not have resulted in much anatomical knowledge, and it is therefore to the dark history of primitive men we turn in the search for the origin of human dissection.

The earliest and most primitive men were ignorant of the art of domesticating wild animals, and were unacquainted with agriculture; they knew nothing of the art of making weapons for defence, or for the killing of game. They were dependent for their food on such edible roots and berries as thrived in a state of nature. But with the progress of time, they learned to form rough weapons from sharp stones and branches of trees with which to defend themselves against attacks from savage animals. And presently they learned to use as food the flesh of the animals thus killed.

This period, when men learned for the first time the value of animal flesh as food, is memorable in the history of anatomy. It was from this time that interest in the study of anatomy began; for in order to kill an animal it was necessary to know the portion of the body most essential to life, that the hunter might strike with the deadliest effect.

An even more powerful incentive to anatomical investigation arose from man's superstitions of things not rightly understood in the world around him. Misled by erroneous ideas of a hereafter, and by false teachings regarding the Divine Being, he attempted to propitiate the gods by gifts and offerings. From time immemorial, it has been the custom to make such gifts in the form of food, and the kind of food allotted to this purpose is commonly the carcass of some edible animal. But such an offering could not be selected without the aid of anatomy. For the organs had to be examined in the greatest detail, because it was believed that certain marks were made upon them by the god himself which showed his goodwill, or displeasure, and even indicated to the faithful the course of future events. The liver was the organ principally concerned in information of this nature, and the skilled diviner could interpret the mysterious signs and marks upon it. These signs were, of course, only the highly varied natural shapes and markings to be seen on any animal's liver, but the early races, especially the Babylonians, believed that they were signs placed there by the god to whom the animal was offered as a sacrifice. In the British Museum there is a clay model of a sheep's liver used for instruction in liver divination in a Babylonian Temple School. It is covered with cuneiform writing which fixes the date of the model to about 2000 B.C. The art of reading the future in this way spread westward to Rome, and similar models in bronze of the sheep's liver have been found belonging to the Etruscan period.

But a more direct source of knowledge concerning human anatomy soon replaced these dietetic and theological studies; it resulted from that most frightful form of worship in which human sacrifices were offered to the gods; from the custom of deliberately torturing and murdering prisoners taken in war; and from the still less pleasant habit of consuming as food the bodies of prisoners taken in war.

Every nation of whom records have been preserved, at some period of their history appear to have been guilty of offering up human sacrifice. Even before historic times, the evidence of fossils suggests that men practised cannibalism. In the Rock Shelter in Krapina there have been found human bones burned by fire, and broken as if to extract marrow. The devouring of the human body may have been, like the custom of modern Australian aborigines, a ceremonial and reverent method of disposing of dead bodies. But whatever the object, the ancient nations, Persians, Tyrians, Spartans, Cretans, Phœnicians, Egyptians, Carthagenians, Greeks, Romans, and Gauls, all were guilty of this dreadful custom. Even within comparatively recent times this form of worship was practised, and details of the ceremony, as performed by the Mexicans, are given in an English translation of Acosta :—

"The high priest opened the stomach of the victim, with a knife made of a large

flint, with considerable dexterity and nimbleness, tearing out the heart with his hands, which he elevated smoking towards the sun, to whom he did offer it, and presently turning towards the idol, did cast the heart towards it."

This method of removing the heart shows no inconsiderable knowledge of anatomy. To remove the human heart it is quicker to cut open the abdominal wall, and to perforate the diaphragm, than to cut through the ribs and raise the sternum in the ordinary post-mortem method.

Now, in the attempt to propitiate the deity, men were ever conscious of the human prompting to place on the sacred altar such offerings as would be agreeable to themselves. Among such offerings, food constituted an important part, and the choice of provisions depended largely upon the notions of what was good and agreeable food to the minds of the pious. Amongst a race of cannibals, human flesh would be highly prized, and human flesh would therefore be considered a worthy offering.

Torturing prisoners taken in war was no less general among savage peoples. This was a primitive form of vivisection, and physiological facts could hardly fail to spring to light, particularly with regard to the parts of the body endowed with the highest degree of sensibility, and the parts which were most essential to life.

It is probable that these were some of the principal sources of information regarding the anatomy of the human body open to early men, but one more source of information may be added: the examination of wounds received in battle. During the early ages of the world's history, men were almost constantly at war, and the most inward recesses of the human body would most certainly have been exposed to view by the injuries received.

Among the Tebeitians a whole system of anatomy and physiology was built up around observations made on wounded men. Captain Cook told how they believed that the seat of life was in the stomach and intestines, and when the people were questioned on the matter, advanced as arguments that men never recovered from serious wounds of the intestinal tube, and as further proof, pointed out to the sickness, vomiting, and other disorders, incident to these parts from mental causes, such as fear and other violent passions.

From these notes it would appear that the only progress made by primitive peoples towards a knowledge of human anatomy, was that which influenced the life and death of men when put to torture, or when placed on the altar as human sacrifices; or that which facilitated the carving up of the different parts in cannibal feasts. No investigations were made purely for the sake of knowledge until the time of Aristotle (*c.* 350 B.C.); but this great worker was obliged to confine his activities to the study of the lower animals. The Greeks, at this period, possessed such stringent laws regarding the immediate burial of the dead, that Aristotle would have found it impossible to obtain bodies for dissection. And it was not until the foundation of the great Medical School at Alexandria that scientific dissection of the human body was begun. The bodies of condemned criminals were

placed at the disposal of Herophilus (*c.* 290 B.C.) and Erasistratus (*c.* 270 B.C.) for anatomical examination, and for the first time in history, a description of the human frame was made from systematic dissections of the human body. It has been said that these two anatomists were not satisfied with dissecting dead bodies, and that they procured criminals while they were still alive, and subjected them to experiments of all kinds, so anxious were they to penetrate the secrets of nature and life. Tertullian, one of the most learned fathers of the early Christian Church, makes this charge in the following terms :—

"Herophilus, that physician, or rather butcher, who dissected six hundred men, in order to find out nature; who hated man, in order to learn the structure of his frame; could not, by these means, come to a more perfect knowledge of his internal structure, since death produces a great change in all the parts, so as to render their appearance after death different from what it was before; especially, since they did not die a natural death, but expired amidst all the agonies to which the curiosity of the anatomist was pleased to subject them."

It is said that it was taught : "It is by no means cruel as most people represent it, by the torture of a few guilty, to search after remedies for the whole innocent race of mankind."

In spite of the high authority of the person who brought forward this charge; and notwithstanding the rudeness of the age in which Herophilus lived and of the acknowledged manners and customs, too often unpitying, of the ancients; and of the contempt which they generally expressed for the sufferings of criminals and slaves, it is difficult to believe that men may have been found so lost to the sentiments of humanity, as to deliver to the knife of the anatomist, the unfortunate condemned, in the hope of discovering in the depths of the palpitating entrails, the secret of life. Then too, Tertullian lived about five hundred years later than Herophilus, and he could not have known anything about the work of the latter except by vague and traditionary reports, which, could they have been traced to their source, would in all probability have been found to be based on the fact of his having been the first to openly dissect human bodies.

The novelty and the daring of Herophilus's dissections no doubt impressed with horror the minds of his less enlightened contemporaries. Vague reports would be handed down to succeeding generations with becoming amplifications and embellishments.

Be that as it may, we know from the writing of Galen that Herophilus was the first human anatomist, that "he was an accomplished man in all the branches of physic; excelling particularly in anatomy, which he learned, not from the dissection of beasts alone as physicians usually do, but principally from that of men."

In this rapid survey of the habits of primitive men, it is seen that the earliest interest in anatomy began in the search for the most vulnerable point towards which the hunter might direct his blow, in order to bring wild animals to the ground. The second point of interest was to find the positions of the joints, and to learn how best to cut up the carcass of an animal with the minimum of trouble,

and to carve it into neat joints and steaks. But as men multiplied upon the earth, and tribes were formed, warfare arose, and men began to seek out the most vital parts of the human body. Offerings and sacrifices were made to propitiate the gods before these wars; and when cannibalism was evolved, human flesh, the scarcest and most valued form of food, was the natural offering at the altar, and man the most desirable sacrifice to the gods. Anatomical interest was, in this way, transferred by a natural sequence of events to the priesthood. Here interest in anatomy remained until the practice of embalming the dead body for the use of the soul for all time caused a special sect of priests to be set aside for this particular purpose. It is therefore not surprising to find that the earliest beginnings of dissection and anatomical study should be found in Egypt, in the work of the special priests, the embalmers, and that the first real scientific anatomists should be found at a later date in Alexandria, the intellectual centre of ancient Egypt.

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AN OLD MINUTE BOOK

I HAVE before me as I write a Minute-book which was opened on 7th May, 1860, and has now been closed, the last entry having been made on 28th April, 1938. For seventy-eight years there have been faithfully recorded in its pages the transactions of the Belfast Branch of the Royal Medical Benevolent Fund Society of Ireland. The book itself is bound in leather, and an expert assures me that "one would pay a pretty penny for paper of that quality in a minute-book nowadays"—but money went further in 1860, and a pound purchased more.

The first entry records "a meeting of Committee held in the Library Room of the Belfast General Hospital on Monday, 7th May, 1860—Present: Doctor T. H. Purdon (in the chair), Doctors Patterson, H. S. Ferguson, Moore, Browne, and Stewart." (Doctor Purdon was "permanent president," and himself a most generous supporter of the Charity. ". . . The treasurer (Doctor S. Browne, father of Sir Walton Browne) "reported that he had now in hands the sum of £113. 2s. 6d. as the proceeds of the past year of the Branch." The names of four ladies were forwarded to headquarters as suitable recipients of grants, and then the minutes go on as follows:—"The secretary reported that, agreeably to the instructions given to him at last meeting, he had transmitted as many as 134 printed appeals to the profession throughout the district, the practical responses to which, however, did not exceed thirty, and in sums varying from £1 to 2s. 6d."

How does this compare with the last minutes recorded in the book? These, in 1937, report that "the subscriptions to date amount to £129. 7s., the decrease from last year being accounted for by the fact that last year donations of £20 and £5 had been received and that some subscriptions had not yet been paid, although special letters had been sent to those concerned." A few additional subscriptions brought the total further above the 1860 level—that is if one overlooks the fact that £1 in 1860 had the same purchasing power as £2. 10s. has in 1938. And how many doctors were in practice in Belfast and County Antrim in 1860, compared with 1938? And what was their aggregate income? So large now, I suppose, that